The degree of lipophilization affects antioxidative efficacy of ferulates in omega-3 enriched milk

Sørensen, Ann-Dorit Moltke; Lyneborg, Karina Sieron; Villeneuve, Pierre; Jacobsen, Charlotte

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The degree of lipophilization affects antioxidative efficacy of ferulates in omega-3 enriched milk

Ann-Dorit Moltke Sørensen, Karina Sieron Lyneborg, Pierre Villeneuve & Charlotte Jacobsen

Foods containing omega-3 PUFA are highly susceptible to oxidation. One strategy to limit lipid oxidation is addition of antioxidants. The efficacy of antioxidants can vary with the complexity of the food matrix. Lately, extensive work has been performed on phenolipids and their antioxidant efficacy in model emulsion systems. Results indicated a cut-off effect in relation to the alkyl chain length grafted to the phenolic compounds.

The impact of emulsion composition on the antioxidant activity has previously been demonstrated for caffeates in milk and mayonnaise. Different critical chain lengths (cut-off) were observed for the two food systems. Thus, a better understanding of the antioxidative effect of phenolipids in complex foods is of great interest.

The aim of this study was to evaluate the antioxidative effect of ferulic acid and its esters, ferulates, in fish-oil-enriched milk. Lipid oxidation was evaluated from 3 parameters measured over storage time: peroxide value, volatiles and tocopherol concentrations. The results demonstrated that the composition of food emulsions influenced the antioxidative effect of ferulates. Depending on the lipophilization degree, ferulates acted surprisingly either as antioxidants or prooxidants. These results were more complex than what was expected from the cut-off hypothesis.

Keywords: Phenolipids; Lipid oxidation; Cut-off effect